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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/582,454	06/12/2006	Fujio Kizaki	MAT-8838US	2084
53473	7590	05/13/2008		
RATNERPRESTIA P.O. BOX 980 VALLEY FORGE, PA 19482			EXAMINER LAXTON, GARY L.	
			ART UNIT 2838	PAPER NUMBER
			MAIL DATE 05/13/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/582,454

Applicant(s)

KIZAKI ET AL.

Examiner

Gary L. Laxton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 January 2008.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-16 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 30 January 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-8508)
4) ☐ Interview Summary (PTO-413)
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____
Paper No(s)/Mail Date _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-16 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

2. Claims 7, 8, 10-13, 15 and 16 are objected to because of the following informalities:

Claim 7 recites the limitation "the diode" in line 3. There is insufficient antecedent basis for this limitation in the claim. The applicant recited "a diode" in claim 1 as well. Which diode is the applicant referring to?

Claim 8 recites the limitation "the diode" in line 3. There is insufficient antecedent basis for this limitation in the claim. The applicant recited "a diode" in claim 1 as well. Which diode is the applicant referring to?

Claim 10 recites the limitation "the diode" in line 3. There is insufficient antecedent basis for this limitation in the claim. The applicant recited "a diode" in claim 1 as well. Which diode is the applicant referring to?

Claim 11 recites the limitation "the diode" in line 2. There is insufficient antecedent basis for this limitation in the claim. The applicant recited "a diode" in claim 1 as well. Which diode is the applicant referring to?

Claim 12 recites the limitation "the diode" in line 3. There is insufficient antecedent basis for this limitation in the claim. The applicant recited "a diode" in claim 1 as well. Which diode is the applicant referring to?

Claim 13 recites the limitation "the diode" in line 3. There is insufficient antecedent basis for this limitation in the claim. The applicant recited "a diode" in claim 1 as well. Which diode is the applicant referring to?

Claim 15 recites the limitation "the diode" in line 3. There is insufficient antecedent basis for this limitation in the claim. The applicant recited "a diode" in claim 1 as well. Which diode is the applicant referring to?

Claim 16 recites the limitation "the diode" in line 3. There is insufficient antecedent basis for this limitation in the claim. The applicant recited "a diode" in claim 1 as well. Which diode is the applicant referring to?

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claims 1, 2, 4, 5, 9 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art figure 4 in view of Campbell (US 3,577,040), Beck et al. (US 3,986,099), Podobinski (US 4,544,978) or Fabianowski et al. (US 4,942,494).

Applicant's prior art figure 4 discloses a power source device comprising: a transformer (2) having a first winding (201,202) and a second winding (203); an oscillator (4) self-oscillating with using the first winding of the transformer, and supplying an oscillating voltage to the first winding, the transformer generating an alternating current (AC) voltage at the second winding responsive to the oscillating voltage supplied from the first winding; a rectifier (3) for converting the AC voltage output from the second winding into a direct current (DC) voltage, and outputting the DC voltage; first and second output terminals for outputting the DC voltage output from the rectifier (3); wherein the first and second output terminals are connected with a load charged with an electric charge having a polarity reverse to the polarity of the DC voltage. Moreover, a zener diode 105 is connected between the rectifier and output terminals.

However, applicant's prior art figure 4 does not disclose a diode connected between the first and second output terminals of the rectifier so that a polarity of the diode is reverse to a polarity of the DC voltage and so that the diode conducts in only one direction independent of the DC voltage across the first and second output terminals.

(US 3,577,040) Campbell teaches a circuit is completed with a diode 60 connected across the output terminals 13, 14, in parallel with the load 10 and in a polarity opposite to that of the high- and low-voltage rectifiers 28, 30. It is apparent that this circuit may be designed to operate with the output terminals 13, 14 in a reverse polarity, in which application diode 60 and rectifiers 28, 30 will retain the same relative relationship but be oppositely poled. And, on the half cycles when SCR 28 is not conducting, the higher voltage energy stored in inductor 12 can flow through the diode 60 in the direction in which the diode 60 is poled. Such current flow in load 10 will be in the same direction as that current primarily establishing the magnetic field from the SCR 28 so as to tend to maintain the magnetic field about the inductor 12 which aids in holding the load in an energized condition and prevents load chatter. This diode action is especially advantageous in the hold condition when only SCR 30 is in a conducting state. Due to the less intense magnetic field retaining the armature of the solenoid in the actuated condition, armature chatter is accentuated and drop out is more likely, both of these effects being deemphasized by the action of diode 60.

(US 3,986,099) Beck et al. teaches; a load control circuit 14 also includes a free-wheeling diode 26 which is connected across the load 10 between the conductors 20 and 22 by a conductor 28. Such a diode is a normal component in a chopper load control circuit.

(US 4,544,978); Podobinski teaches a freewheeling diode 70 in circuit 10 desirably provides a current path to discharge the stored energy in the magnetic field of the load under overload conditions, especially if the load is an inductive load, and desirably assists in preventing discharge of this stored energy into rectifier bridge 16. Freewheeling diode 70 is an example of a suitable means for discharging stored energy in the magnetic field of a direct current load under

overload conditions by providing a current path for this stored energy to promote the de-energization of the direct current load. Freewheeling diode 70 in circuit 10 would desirably provide, under overload conditions, an alternate path for current circulation to discharge the stored energy in the magnetic field of the load and to substantially prevent such stored energy from being discharged through rectifier bridge 16.

(US 4,942,494); Fabianowski et al. teach a half-controlled rectifier bridge is bypassed in a conventional manner by means of a free-wheeling diode D7 connected in parallel with the load

1. Such a circuit reliably disconnects the rectifier bridge and also protects the rectifier components against overvoltage from the power system and from the commutation, in case of a short-circuit.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the prior art figure 4 to include a diode connected between the first and second output terminals of the rectifier so that the polarity of the diode is reverse to a polarity of the DC voltage and so that the diode conducts in only one direction independent of the DC voltage across the first and second output terminals as taught by Campbell, Beck et al., Podobinski or Fabianowski et al. so that stored energy can be released to the load or to provide a current path to discharge the stored energy in the magnetic field of the load under overload conditions and desirably assists in preventing discharge of this stored energy back into converter circuit.

6. Claims 3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art figure 4 in view of Campbell, Beck et al., Podobinski or Fabianowski et al. and further in view of Sona.

The applicant's prior art figure 4 in combination with Campbell, Beck et al., Podobinski or Fabianowski et al disclose the claimed subject matter in regards to claims 1 and 4 except for the wherein the rectifier comprises a voltage multiplier rectifier.

Sona teach a voltage generator having a rectifier multiplier to boost the voltage at the output of a full bridge rectifier.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the applicant's prior art figure 4 and Campbell, Beck et al., Podobinski or Fabianowski et al to include a rectifier that is a multiplying rectifier as taught by Sona in order to boost the output voltage to power a high voltage load.

7. Claims 7, 8, 10, 12, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art figure 4 in view of Campbell, Beck et al., Podobinski or Fabianowski et al. and further in view of Maller (US 6,256,185).

The applicant's prior art figure 4 in combination with Campbell, Beck et al., Podobinski or Fabianowski et al disclose the claimed subject matter in regards to claim 1 supra except for the rectifier includes a rectifier diode, and the forward voltage of the [first] diode is lower than a forward voltage of the rectifier diode.

Maller teaches that there are several benefits from the lower forward voltage drop exhibited by output diode devices such as a Schottky device. An appropriately sized standard fast

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recovery rectifier might exhibit a forward voltage drop of about one (1) volt, a similarly sized Schottky diode would exhibit a forward drop of approximately one-half (0.5) volts. This means that at a given current level, the Schottky device is dissipating about one-half the power and thereby generating one-half the heat output as compared to the standard device. If both devices are constructed using the same mechanical structure and implying the package will exhibit the same thermal resistance junction to ambient, then the temperature rise of Schottky device will be one-half that of the standard fast recovery diode. This ultimately allows the use of a smaller device or a reduction or elimination of heat sink provisions when using the Schottky diode. The net result includes, among other benefits, lower cost and a smaller end product.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the applicant's prior art figure 4 and Campbell, Beck et al., Podobinski or Fabianowski et al to include a rectifier that includes a rectifier diode, and the forward voltage of the [first] diode is lower than a forward voltage of the rectifier diode in order to dissipate less power and less heat than a standard rectifier and allow the use of smaller devices, reduction of heat which translates into lower cost and smaller end products as taught by Maller.

8. Claims 11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art figure 4 in view of Campbell, Beck et al., Podobinski or Fabianowski et al. and further in view of Sona and still further in view of or Maller.

The applicant's prior art figure 4 in combination with Campbell, Beck et al., Podobinski or Fabianowski et al and Sona disclose the claimed subject matter in regards to claims 1 and 5

supra, except for the rectifier includes a rectifier diode, and the forward voltage of the [first] diode is lower than a forward voltage of the rectifier diode.

Maller teaches that there are several benefits from the lower forward voltage drop exhibited by output diode devices such as a Schottky device. An appropriately sized standard fast recovery rectifier might exhibit a forward voltage drop of about one (1) volt, a similarly sized Schottky diode would exhibit a forward drop of approximately one-half (0.5) volts. This means that at a given current level, the Schottky device is dissipating about one-half the power and thereby generating one-half the heat output as compared to the standard device. If both devices are constructed using the same mechanical structure and implying the package will exhibit the same thermal resistance junction to ambient, then the temperature rise of Schottky device will be one-half that of the standard fast recovery diode. This ultimately allows the use of a smaller device or a reduction or elimination of heat sink provisions when using the Schottky diode. The net result includes, among other benefits, lower cost and a smaller end product.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the applicant's prior art figure 4 and Campbell, Beck et al., Podobinski or Fabianowski et al and Sona to include a rectifier that includes a rectifier diode, and the forward voltage of the [first] diode is lower than a forward voltage of the rectifier diode in order to dissipate less power and less heat than a standard rectifier and allow the use of smaller devices, reduction of heat which translates into lower cost and smaller end products as taught by Maller.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Niederreiter (US 4,985,818) discloses a DC/AC/DC converter with a diode in parallel with the output terminals.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gary L. Laxton whose telephone number is (571) 272-2079. The examiner can normally be reached on Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Akm Ullah can be reached on (571) 272-2361. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

5/11/2008

/Gary L. Laxton/
Primary Examiner
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